

REMARKS

This is a full and timely response to the outstanding final Office Action mailed April 15, 2004. Claims have been amended, but include limitations present in the claims as originally filed, thus obviating any need to perform additional searching. Reconsideration and allowance of the application and presently pending claims are respectfully requested.

I. Supplemental Action

A supplemental action was mailed on 5/13/2004. The action provides as follows:

In the final Rejection dated 15 April 2004, the Affidavit under 37 C.F.R. 131 filed 19 February 2004 was inadvertently overlooked. Examiner has formally considered this paper. The rejection to the claims in view of the reference to Qu has therefore been overcome solely responsive to the Affidavit. The status of claims is now as follows: Claims 1-11, 13-30, 32, and 38 are rejected. Claims 31 and 33-37 are objected to.

Applicant appreciates the consideration and acceptance of the Affidavit and removal of the *Qu* reference (*Qu*, U.S. Pat. No. 6,292,061).

II. Objection to Drawings

In the Office Action, the drawings were objected to as allegedly being unclear.

Specifically, the Office Action provides as follows:

While new Fig. 3B is acceptable to overcome the previous drawing objection, Figs. 3A and 3B are further objected to being unclear. The specification discloses element 36 as being filter. However, the present combination for element 360 will not operate. Element 363 is an N-channel transistor having its drain/source terminals connected to the Vb/Vb1 terminal and the Vcn terminal and having its gate connected to ground. With this connection, transistor 362 will always be off. It appears that Figs. 3A and 3B should be

change such that either 1) the drain and source of transistor 362 be connected together or 2) the conductivity types of transistors 362 and 364 be exchanged.

The drawings are also objected to as the conductivity types shown in Figs. 3A and 3B must necessarily be incorrect. Firstly, if transistor 310-316 are N-channel, as shown, they cannot possibly operate as current mirrors. Clearly, transistors 310-316 would necessarily have to be P-channel transistors to operate as current mirrors. Secondly, if transistor 318-320 are P-channel, as shown, they cannot possibly operate as differential pairs. Clearly, transistors 318-320 would necessarily have to be N-channel transistors to operate as differential pairs. And thirdly, if transistor 326-328 are P-channel, as shown, they cannot possibly operate as tail current source transistors (to bias the differential pairs). With this conductivity type shown, transistors 326 and 328 would operate as source followers. Clearly, transistors 326-328 would necessarily have to be N-channel transistors to operate as current mirrors.

Examiner notes that the only way that the circuit of Figs. 3A and 3B can operate with the connections shown is to exchange the Vdd and ground connections.

A proposed drawing correction or corrected drawings are required in reply to the Office Action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

Applicant respectfully disagrees. First, presumably, the Office Action means filter 360, not 36, and transistor 362, not 363. Second, transistor 362 is not shown as an N-channel transistor, but a P-channel transistor, which is always on. Thus, Applicant respectfully submits that the filter 360 is fully operational as shown.

With regard to conductivity types, again, the Office Action is providing an inaccurate designation to the transistors, which is probably what is leading to the confusion about the operation of the circuits shown in Figs. 3A and 3B. For example, transistors 310-316 are not an N-type transistor, but is a P-type transistor. Similarly, the designations the Office Action is prescribing to the transistors is opposite to that which is shown. Thus, Applicant respectfully requests that the drawing objection be withdrawn.

III. Objection to Specification

The Office Action alleges the following with regard to the objection to the specification:

The specification is objected to for improperly identifying the conductivity types and drain and sources of the transistors shown in Figs. 3A and 3B. Reference is made to the above objection to the drawings. The specification is objected to for reasons as the drawings.

Applicant respectfully submits that the specification has been amended to correct the inaccuracies in the specification. Applicant respectfully submits that with these amendments to the specification, the objection to the specification has been overcome. Thus, Applicant respectfully requests that the objection to the specification be withdrawn.

IV. Objection to Claims

The Office Action alleges the following with regard to the objection to the claims:

Claims 1-11 and 13-38 are objected to for improperly identifying the conductivity types and drain and sources of the transistors shown in Figs. 3A and 3B for similar reasons as discussed above. Appropriate corrections for the above discussed objections are required.

Applicant respectfully submits that claim 1 has been amended to correct the inaccuracies in source and drain designation. As there are no inaccurate references to source and drain or conductivity type elsewhere, Applicant submits that the objection to the claims has now been overcome. Thus, Applicant respectfully requests that the objection to the claims be withdrawn.

V. Claim Rejections Under 35 USC § 112

Claims 1-11, 13-25, 28, and 29 have been rejected under 35 USC § 112, first paragraph, allegedly based on a disclosure which is non-enabling. In particular, the Office Action alleges (in part) the following:

Claims 1-11, 13-25, 28, and 29 are rejected under 35 USC § 112, first paragraph, as based on a disclosure which is non-enabling. The “phase and frequency detector”, the “loop filter”, the “voltage controlled oscillator” and the “current controlled oscillator” is deemed critical or essential to the practice of the invention, but is not included in the claim(s). An arrangement lacking this feature is not enabled by the disclosure since it cannot be understood from the specification how the circuit will operate without such...

Claims 1-11 and 13-29 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In claim 1, in lines 16-18, there is no support found for the “first and second output nodes” or the “output signals”. As seen in Figs 3 and 5, the circuit only has one output providing one signal Vcp.

Examiner has fully considered Applicant’s remarks for the above rejection and has not found them to be persuasive. Examiner acknowledges terminal Vcn of Figs. 3A and 3B, however, such would not be reasonably considered to be an “output” of the “charge pump” as claimed. As seen, Vcn is the output filter which is a connection to one of the “reference signal” Vb.

Claims 2-11 and 13-27 are rejected as including the indefiniteness discussed above with claim 1.

With regard to the absence of elements deemed critical or essential to the practice of the invention, Applicant has amended claims 1-11, 13-25, 28, and 29 to reflect claims directed to a “charge pump” as opposed to a “phase lock loop,” as originally claimed. Thus Applicant respectfully submits that all essential or critical elements have been included in the amended claims, and that the rejection as to this aspect has been overcome.

With regard to the 35 USC § 112, second paragraph rejection to claim 1, Applicant submits that “first and second output nodes” and “output signals” are provided for and supported in the specification. Indeed, the first and second output nodes provide for output signals Vcp and Vcn. Applicant would respectfully like to direct the Examiner’s attention to page 5, lines 26-28, which provides as follows:

While the charge pump 108 and the loop filter 110 are illustrated as separate devices, the term “charge pump” may include a charge pump with an integrated loop filter.

It is a well-established axiom in patent law that a patentee or applicant is free to be his or her own lexicographer (see MPEP 2173.05a). Additionally, Applicant would also like to call attention to the fact that Figs. 3A and 3B are each entirely referenced by the reference numeral 300, and that those figures show a filter and charge pump as a combined circuit. Thus, Applicant respectfully submits that the rejection of claim 1 (and claims 2-11 and 13-27) under 35 USC § 112, second paragraph has been overcome. Since the rejection has been overcome, Applicant respectfully requests that the rejection be withdrawn.

VI. Rejection of Claims 1, 10, 11, 13-24, 28 and 29 Under 35 USC § 102 (b)

A. Statement of the Rejection

Claims 1, 10, 11, 13-24, 28 and 29 are rejected under 35 U.S.C. Section 102(b) as allegedly being anticipated by *Lee* (U.S. Pat. No. 5,889,437).

Applicant respectfully traverses this rejection.

B. Discussion of the Rejection

It is well established at law that, for a proper rejection of a claim under 35 U.S.C. §102 as being anticipated based upon a single reference, the reference must disclose, teach, or suggest, either implicitly or explicitly, all elements/features/steps of the claim at issue. *See, e.g., In Re Dow Chemical*, 5 U.S.P.Q.2d 1529, 1531 (Fed. Cir. 1988), and *In re Keller*, 208 U.S.P.Q.2d 871, 881 (C.C.P.A. 1981).

In the present case, not every feature of the claimed invention is represented in the Lee reference. The Office Action alleges the following:

Lee discloses, in Fig. 7, a circuit comprising: “a first input stage” having “a first input transistor (M41)”, “a first complementary transistor (M42)”, “a first discharging transistor (M45)” and “a charging transistor (M47)”; “a first control signal (UP)”; “a first reference signal (UP—upper score)”; “a second input stage” having “a second input transistor (M43)”, a complementary transistor (M44)”, “a second discharging transistor (M46)” and “a charging transistor (M50)”; “a second control signal (DN)”; “a second reference signal (DN—upper score)”; and “a loop filter (R1, C1, C2)”, all connected and operating similarly as recited by Applicant.

Not every feature of independent claim 1 is disclosed in the Lee reference. In particular, Lee does not disclose at least the feature of “the first complementary transistor is operable to receive a first reference signal,” nor “the second complementary transistor operable to receive a second reference signal” as recited in claim 1. The Office Action alleges the following in rebuttal to arguments presented in the last response:

Further, with respect to Applicant’s remarks concerning the “reference signal”. However, it is notoriously well known that the complement of a signal can reasonably be considered a reference for that signal. It appears Applicant is giving too much limitation to the “reference signal”.

Applicant respectfully disagrees, and does not understand the reasoning in equating a complement signal with a bias signal. *Lee* appears to show four control signals, UP, UP upper score, DN, and DN upper score. One skilled in the art should recognize that these are not **biasing signals**. Further, Applicant is setting forth how the structure corresponding to claim 1 is distinct from the structure shown in Fig. 7 of *Lee*, and not focusing on the reference signal per se, since apparatus claims must be structurally distinguishable from the prior art (see MPEP 2114). The circuit structure corresponding to one embodiment of the present invention, as recited in claim 1, enables the operation of a charge pump using first and second control signals at a first and second input transistor, and a first and second **biasing signal** at a first and second complementary transistor. The biasing signals in the context of the present invention are used to lower the switching noise of the charge pump output. Merely using the inverted control signal, as suggested by the Office Action, does not lower the switching noise at the output of the charge pump. In stark contrast, Applicant respectfully submits that it appears that *Lee* discloses reducing the effects of power supply noise, as opposed to switching noise (see col. 2). Thus, Applicant respectfully submits that *Lee* does not teach every feature of claim 1. Thus, for at least these reasons, Applicant respectfully requests that the rejection to claim 1 should be withdrawn.

Because independent claim 1 is allowable over *Lee*, dependent claims 2-11, and 13-25 are allowable as a matter of law for at least the reason that the dependent claims 2-11 and 13-25 contain all the elements of their respective base claim. See, *e.g.*, *In re Fine*, 837 F.2d 1071 (Fed. Cir. 1988).

In addition, Applicant also respectfully traverses the rejections of the dependent claims on other grounds. For example, in claim 15, it is apparent that *Lee* uses a **RC filter** on the output, rather than a transistor-based filter as claimed. Thus, Applicant respectfully requests that the rejection to claim 15 be withdrawn.

As another example, it is apparent that *Lee* does not disclose “where the charge pump operates with a supply voltage of less than 2.5 volts,” as recited in claim 20. Thus, Applicant respectfully requests that the rejection to claim 20 be withdrawn.

As another example, it is apparent that *Lee* does not disclose “where the charge pump operates with a supply voltage of less than 1.9 volts,” as recited in claim 21. Thus, Applicant respectfully requests that the rejection to claim 21 be withdrawn.

With regard to independent claim 28, Applicant respectfully submits that independent claim 28 is allowable for at least the reason that *Lee* does not teach, disclose, or suggest at least the feature of “providing a biasing signal to first and second complementary transistors such that the complementary transistors change states between off and on substantially complementary to the state of the respective first and second switching transistors,” as recited in claim 28. That is, one embodiment of the present invention, as recited in claim 28, enables the user to operate a charge pump using a biasing signal at a first and second complementary transistor.

Applicant respectfully submits that *Lee* does not teach, disclose, or suggest at least the feature of “providing a biasing signal to first and second complementary transistors,” as recited in claim 28. In particular *Lee* appears to show four control signals, UP, /UP, DN, /DN connected to the first and second input transistors, and to the first and second complementary transistors. These are not biasing signals. The biasing signals in the

context of the present invention are used to lower the switching noise of the charge pump output. Merely using the inverted control signal does not lower the switching noise at the output of the charge pump. Thus, Applicant respectfully submits that *Lee* does not teach every feature of the claimed method. Thus, for at least these reasons, Applicant respectfully requests that the rejection to independent claim 28 be withdrawn.

Because independent claim 28 is allowable over the prior art of record, dependent claim 29 (which depends from independent claim 28) is allowable as a matter of law.

VII. Rejection of Claims 30, 32 and 38 Under 35 USC § 102 (b)

A. Statement of the Rejection

Claims 30, 32 and 38 are rejected under 35 U.S.C. Section 102(b) as allegedly being anticipated by *Kawasaki* (U.S. Pat. No. 5,955,904).

Applicant respectfully traverses this rejection.

B. Discussion of the Rejection

Applicant respectfully submits that independent claim 30 is allowable for at least the reason that *Kawasaki* does not teach, disclose, or suggest at least the feature of “a second transistor pair, comprising a second switching transistor and a second complementary transistor,” nor “a second switching transistor gate, associated with the second switching transistor, coupled to a second control signal, and a second complementary transistor gate, associated with the second complementary transistor, being coupled to the constant bias voltage such that the second complementary transistor is indirectly controlled by the second control signal,” as recited in claim 30. In particular

Kawasaki only shows a single transistor pair. Thus, for at least these reasons, Applicant respectfully requests that the rejection to independent claim 30 be withdrawn.

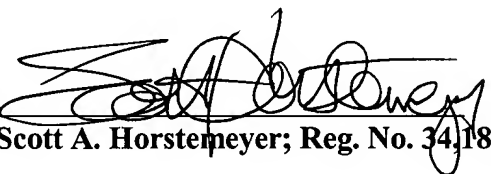
Furthermore, because independent claim 30 is allowable over *Kawasaki*, dependent claims 31-38 are allowable as a matter of law for at least the reason that dependent claims 31-38 contain all features/elements of independent claim 30.

CONCLUSION

In light of the foregoing amendments and for at least the reasons set forth above, Applicant respectfully asserts that all objections and/or rejections have been traversed, rendered moot, and/or accommodated, and that the now pending claims 1-11 and 13-25, and 28-38 are in condition for allowance. Favorable reconsideration and allowance of the present application and all pending claims are hereby courteously requested. If, in the opinion of the Examiner, a telephonic conference would expedite the examination of this matter, the Examiner is invited to call the undersigned attorney at (770) 933-9500.

Respectfully submitted,

**THOMAS, KAYDEN,
HORSTEMEYER & RISLEY, L.L.P.**

By: 
Scott A. Horstemeyer; Reg. No. 34,183

100 Galleria Parkway N.W.
Suite 1750
Atlanta, Georgia 30339
(770) 933-9500